

IN THE CLAIMS:

1 1. (CANCELLED)

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1 4. (ORIGINAL) A method for generating a point-in-time restoration of a set of database files
2 and a set of associated log files to an active file system, the method comprising the steps of:
3 selecting, by a user, a backup to restore therefrom, the backup comprising a snapshot
4 of a file system including the set of database files and copies of the associated log files;
5 verifying the selected backup for coherency;
6 copying, in response to the backup being coherent, the snapshot of the set of database
7 files to the active file system; and
8 copying, in response to the backup being coherent, the copies of the associated log
9 files to the active file system.

1 5. (PREVIOUSLY PRESENTED) The method of claim 4 wherein the step of copying the
2 snapshot to the active file system further comprises the step of:
3 copying contents of a root inode associated with the snapshot to a root inode associ-
4 ated with the active file system.

1 6. (ORIGINAL) The method of claim 4 wherein the backup is selected from a set of backups
2 associated with the active file system.

1 7. (PREVIOUSLY PRESENTED) The method of claim 4 wherein the method further com-
2 prises the step of:

3 renaming the copies of the associated log files to a naming convention of a database
4 server.

1 8. (ORIGINAL) The method of claim 4 wherein the database files and log files are associ-
2 ated with electronic mail messages.

1 9. (ORIGINAL) The method of claim 4 wherein the set of associated log files further com-
2 prises data to be incorporated into the set of database files.

1 10. (ORIGINAL) A method for generating a point-in-time restoration of a set of database
2 files and a set of associated log files to an active file system, the method comprising the steps
3 of:

4 selecting, a backup to restore therefrom, the backup comprising a snapshot of a file
5 system including the set of database files, copies of the associated log files and copies of log
6 files associated with a set of snapshots created later in time than the selected snapshot;

7 verifying the selected backup;

8 copying, in response to the backup being successfully verified, the snapshot of the set
9 of database files to the active file system;

10 copying, in response to the backup being successfully verified, the copies of the asso-
11 ciated log files to the active file system; and

12 copying the copies of the log files associated with the set of snapshots created later in
13 time than the selected snapshot to the active file system.

1 11. (PREVIOUSLY PRESENTED) The method of claim 10 wherein the step of selecting
2 the backup to restore from further comprises the step of:

3 a user selecting, from a set of backups to restore from.

1 12. (PREVIOUSLY PRESENTED) The method of claim 10 wherein the step of copying the
2 snapshot to the active file system further comprises the step of:

3 copying contents of a root inode associated with the snapshot to a root inode associ-
4 ated with the active file system.

1 13. (PREVIOUSLY PRESENTED) The method of claim 10 wherein the method further
2 comprises the step of:

3 renaming the copies of the associated log files to a naming convention of a database
4 server..

1 14. (ORIGINAL) A method for generating a point-in-time restoration from a set of backups,
2 each of the set of backups comprising a snapshot and copies of a set of log files associated
3 with the snapshot, the method comprising the steps of:

4 selecting one of the set of backups to generate the point-in-time restoration therefrom;
5 copying the database files from the snapshot to an active file system; and
6 copying the copies of the set of log files to the active file system.

1 15. (ORIGINAL) The method of claim 14 wherein the method further comprises the step
2 of:

3 renaming the copies of the associated log files to a set naming convention.

1 16. (PREVIOUSLY PRESENTED) The method of claim 14 wherein the step of copying the
2 snapshot to the active file system further comprises the step of:

3 copying contents of a root inode associated with the snapshot to a root inode associ-
4 ated with the active file system.

1 17. (PREVIOUSLY PRESENTED) A method for generating a backup of a set of database
2 files associated with the database program and a set of associated log files, the method com-
3 prising the steps of:

4 performing a snapshot operation on the set of database files; and
5 copying the set of log files to a directory associated with the backup, the set of log
6 files including information that has not yet been incorporated into the database files when the
7 snapshot operation is performed.

1 18. (PREVIOUSLY PRESENTED) The method of claim 17 wherein the method further
2 comprises the step of:

3 validating a snapshot generated by the snapshot operation.

1 19. (ORIGINAL) The method of claim 18 wherein the method further comprises the step
2 of:

3 marking, in response to a successful validation of the snapshot, the snapshot as a
4 backup snapshot.

1 20. (ORIGINAL) A computer-readable medium, including instructions executing on a com-
2 puter, for generating a point-in-time restoration of a set of database files and a set of associ-
3 ated log files to an active file system, the program instructions including instructions for per-
4 forming the steps of:

5 selecting, by a user, a backup to restore therefrom, the backup comprising a snapshot
6 of a file system including the set of database file and copies of the associated log files;

7 verifying the selected backup;

8 copying, in response to the backup being successfully verified, the snapshot of the set
9 of database files to the active file system; and

10 copying, in response to the backup being successfully verified, the copies of the asso-
11 ciated log files to the active file system.

1 21. (ORIGINAL) A computer-readable medium, including instructions executing on a com-
2 puter, for generating a point-in-time restoration of a set of database files and a set of associ-

3 ated log files to an active file system, the program instructions including instructions for per-
4 forming the steps of:

5 selecting, a backup to restore therefrom, the backup comprising a snapshot of a file
6 system including the set of database files, copies of the associated log files and copies of log
7 files associated with a set of snapshots created later in time than the selected snapshot;

8 verifying the selected backup;

9 copying, in response to the backup being successfully verified, the snapshot of the set
10 of database files to the active file system;

11 copying, in response to the backup being successfully verified, the copies of the asso-
12 ciated log files to the active file system; and

13 copying the copies of the log files associated with the set of snapshots created later in
14 time than the selected snapshot to the active file system.

1 22. (PREVIOUSLY PRESENTED) A method for generating a backup of a file system, the
2 method comprising the steps of:

3 rendering the file system coherent in preparation for generating the backup, to pro-
4 duce a coherent file system; and

5 creating a snapshot of the coherent file system, the snapshot created as a copy of a set
6 of pointers to data, the data stored in the coherent file system.

1 23. (PREVIOUSLY PRESENTED) The method as in claim 22, further comprising:

2 incorporating a log file into the file system to render the file system coherent.

1 24. (PREVIOUSLY PRESENTED) The method as in claim 22, further comprising:

2 maintaining the file system available for access by users while generating the backup.

1 25. (PREVIOUSLY PRESENTED) A file system, comprising:

2 means for rendering the file system coherent in preparation for generating the backup,
3 to produce a coherent file system; and

4 means for creating a snapshot of the coherent file system, the snapshot created as a
5 copy of a set of pointers to data, the data stored in the coherent file system.

1 26. (PREVIOUSLY PRESENTED) The file system of claim 25, further comprising:

2 means for incorporating a log file into the file system to render the file system coher-
3 ent.

1 27. (PREVIOUSLY PRESENTED) The file system of claim 25, further comprising:

2 means for maintaining the file system available for access by users while generating
3 the backup.

1 28. (PREVIOUSLY PRESENTED) A file system, comprising:

2 a processor to render the file system coherent in preparation for generating the
3 backup, to produce a coherent file system; and

4 a snapshot manager to create a snapshot of the coherent file system, the snapshot cre-
5 ated as a copy of a set of pointers to data, the data stored in the coherent file system.

1 29. (PREVIOUSLY PRESENTED) The file system of claim 25, further comprising:

2 the processor to incorporate a log file into the file system to render the file system co-
3 herent.

1 30. (PREVIOUSLY PRESENTED) The file system of claim 25, further comprising:

2 the processor and an operating system to maintain the file system available for access
3 by users while generating the backup.

1 31. (PREVIOUSLY PRESENTED) A computer readable media, comprising:

2 said computer readable media containing instructions for execution on a processor for
3 the practice of a method for generating a backup of a file system, the method having the steps
4 of:

5 rendering the file system coherent in preparation for generating the backup, to pro-
6 duce a coherent file system; and

7 creating a snapshot of the coherent file system, the snapshot created as a copy of a set
8 of pointers to data, the data stored in the coherent file system.

1 32. (PREVIOUSLY PRESENTED) Electromagnetic signals propagating on a computer
2 network, comprising:

3 said electromagnetic signals carrying instructions for execution on a processor for the
4 practice of a method for generating a backup of a file system, the method having the steps of:

5 rendering the file system coherent in preparation for generating the backup, to pro-
6 duce a coherent file system; and

7 creating a snapshot of the coherent file system, the snapshot created as a copy of a set
8 of pointers to data, the data stored in the coherent file system.

1 33. (PREVIOUSLY PRESENTED) The method of claim 17 wherein the step of copying
2 further comprises renaming the set of log files.

1 34. (PREVIOUSLY PRESENTED) A method for generating a point-in-time restoration of a
2 database to an active file system, the method comprising the steps of:

3 storing a first snapshot, the first snapshot taken at a first time, the first snapshot in-
4 cluding a set of database files;

5 storing a copy of a first log file, the copy of the first log file associated with the first
6 snapshot, the copy of the first log file including information that had not yet been incorpo-
7 rated into the database files as of the first time;

8 storing a copy of a second log file, the copy of the second log file associated with a
9 second snapshot taken at a second time subsequent to the first time, the copy of the second
10 log file including information received subsequent to the first time that had not yet been in-
11 corporated into the database files as of the second time; and

12 copying the first snapshot, the copy of the first log file, and the copy of the second log
13 file to the active file system, to thereby restore at least a portion of the information received
14 at the database subsequent to the first time without using the second snapshot.

1 35. (PREVIOUSLY PRESENTED) The method of claim 34 further comprising the step of:
2 verifying that the first snapshot, the copy of the first log file, and the copy of the sec-
3 ond log file are not corrupted and are valid.

1 36. (PREVIOUSLY PRESENTED) The method of claim 34 wherein the step of copying
2 further comprises:
3 copying contents of a root inode associated with the snapshot to a root inode associ-
4 ated with the active file system.

1 37. (PREVIOUSLY PRESENTED) The method of claim 34 wherein the step of copying
2 further comprises:
3 renaming the copy of the first log file and the copy of the second log file according to
4 a naming convention of the database such that the first log file and the second log file are
5 recognized by the database.

1 38. (PREVIOUSLY PRESENTED) The method of claim 34 wherein the copy of the first log
2 file and the copy of the second log file are stored in directories of the active file system, the
3 directories also storing meta data associated with the snapshots.

1 39. (PREVIOUSLY PRESENTED) A system for generating a point-in-time restoration of a
2 database to an active file system, the system comprising:
3 a storage device configured to store a first snapshot, the first snapshot taken at a first
4 time, the first snapshot including a set of database files, the storage device further configured
5 to store a copy of a first log file, the copy of the first log file associated with the first snap-
6 shot, the copy of the first log file including information that had not yet been incorporated

7 into the database files as of the first time, the storage device also configured to store a copy
8 of a second log file, the copy of the second log file associated with a second snapshot taken
9 at a second time subsequent to the first time, the copy of the second log file including infor-
10 mation received subsequent to the first time that had not yet been incorporated into the data-
11 base files as of the second time; and

12 a processor configured to copy the first snapshot, the copy of the first log file, and the
13 copy of the second log file to the active file system, to thereby restore at least a portion of the
14 information received at the database subsequent to the first time without using the second
15 snapshot.

1 40. (PREVIOUSLY PRESENTED) The system of claim 39 wherein the processor is further
2 configured to verify that the first snapshot, the copy of the first log file, and the copy of the
3 second log file are not corrupted and are valid.

1 41. (PREVIOUSLY PRESENTED) The system of claim 39 wherein the processor is further
2 configured to copy contents of a root inode associated with the snapshot to a root inode asso-
3 ciated with the active file system.

1 42. (PREVIOUSLY PRESENTED) The system of claim 39 wherein the processor is further
2 configured to rename the copy of the first log file and the copy of the second log file accord-
3 ing to a naming convention of the database such that the first log file and the second log file
4 are recognized by the database.

1 43. (PREVIOUSLY PRESENTED) The system of claim 39 wherein the copy of the first log
2 file and the copy of the second log file are stored in directories of the active file system, the
3 directories also storing meta data associated with the snapshots.

1 44. (PREVIOUSLY PRESENTED) A computer readable medium containing executable
2 program instructions for generating a point-in-time restoration of a database to an active file
3 system, the executable program instructions comprising program instructions adapted for:
4 storing a first snapshot, the first snapshot taken at a first time, the first snapshot in-
5 cluding a set of database files;
6 storing a copy of a first log file, the copy of the first log file associated with the first snap-
7 shot, the copy of the first log file including information that had not yet been incorporated
8 into the database files as of the first time;
9 storing a copy of a second log file, the copy of the second log file associated with a second
10 snapshot taken at a second time subsequent to the first time, the copy of the second log file
11 including information received subsequent to the first time that had not yet been incorporated
12 into the database files as of the second time; and
13 copying the first snapshot, the copy of the first log file, and the copy of the second log
14 file to the active file system, to thereby restore at least a portion of the information received
15 at the database subsequent to the first time without using the second snapshot.

1 45. (New) A method of restoring data in an active file system, the method comprising:
2 selecting, by a user, a backup to restore therefrom, the backup comprising a snapshot
3 of the file system and log files, the log files representing changes to the file system since the
4 snapshot was rendered coherent; and
5 copying, the snapshot of the file system and the log files to the active file system.

1 46. (New) The method according to claim 45, further comprising:
2 verifying the selected backup of coherency, wherein the copying is performed in re-
3 sponse to the backup being verified as coherent.

1 47. (New) A method of restoring data in an active file system, the method comprising:
2 selecting a snapshot by a user, the snapshot including a database and log files associ-
3 ated with the database, the log files including changes to the file system that occurred before
4 the snapshot was generated but had not been incorporated into the database before the snap-
5 shot was generated; and
6 copying the database and the log files associated with the database from the snapshot
7 to the active file system.

1 48. (New) The method according to claim 47, further comprising:
2 selecting, by a user, all additional log files, newer than the selected snapshot, the ad-
3 ditional log files including changes to the file system that occurred after the selected snapshot
4 was generated; and
5 copying the additional log files to the active file system.

1 49. (New) A method of restoring data in an active file system, the method comprising:
2 selecting a snapshot by a user, the snapshot including a pointers to blocks of a data-
3 base and log files associated with the database, the log files including changes to the file sys-
4 tem that occurred before the snapshot was generated but had not been incorporated into the
5 database before the snapshot was generated; and
6 copying the database and the log files associated with the database from the snapshot
7 to the active file system.

1 50. (New) The method according to claim 49, further comprising:

2 selecting, by a user, all additional log files, newer than the selected snapshot, the ad-
3 ditional log files including changes to the file system that occurred after the selected snapshot
4 was generated; and

5 copying the additional log files to the active file system.

1 51. (New) The method according to claim 49, further comprising:

2 verifying the selected backup of coherency, wherein the copying is performed in re-
3 sponse to the backup being verified as coherent.

1 52. (New) A data backup apparatus, comprising:

2 an active file system;

3 a backup including one or more snapshots in communication with the active file sys-
4 tem, the snapshots representing a database at a point in time;

5 metadata associated with each of the snapshots, the metadata in communication with
6 the active file system and including log files which represent changes to the active file sys-
7 tem that occurred before each snapshot was generated but had not been incorporated into the
8 database before the particular snapshot was generated; and

9 a user interface in communication with the active file system, the user interface
10 adapted for selecting a snapshot and log files to restore from associated with the selected
11 snapshot or selecting a snapshot to restore from and all of the log files generated since the
12 selected snapshot was generated.

1 53. (New) The apparatus of claim 52 wherein the snapshot includes pointers to blocks of
2 a database.

- 1 54. (New) The apparatus of claim 52 wherein the snapshot includes data of a database.